Section 12.
Minn Kota Universal Sonar

Minn Kota Universal Sonar motors are serviced in the same manner as their non-Universal Sonar counterparts. Consult the appropriate section of the Minn Kota Service Manual for the step-by-step trouble shooting and repair procedures applicable to the motor being serviced.

This trouble-shooting section DOES NOT take the place of the specific sonar unit's trouble-shooting guide. Consumers should consult their owner's manual for their sonar unit for all depth finder problems.

A capacitance meter and a good quality multi-meter (VOM) are needed to test the transducer and cable installed in the Minn Kota Universal Sonar Motors. We recommend using a Waveteck Meterman model CR50. This meter can be purchased at most major electronics suppliers. (Some better multi-meters may also be capable of measuring capacitance.)

Please note that the transducer is held into the Minn Kota lower unit with tamper-resistant, torx-head screws (T-15). These are torqued to 12-15 inch/pounds. ***The Minn Kota factory warranty will be voided if the consumer tampers with these screws!***

Case I. Sonar display blacks out while trolling motor is running.

(This case refers to suggestions the customer should try with the sonar unit and with his boat wiring.)

Step 1. Consumer should refer to the user's manual for the sonar display configuration options. (Many sonar displays have noise reduction options within their menus.)

Step 2. Reduce gain of sonar display until an adequate display is visible.

Step 3. Determine wiring configuration of the boat

A. If the power leads of the sonar display are routed next to the power leads for the trolling motor for a great distance, separate the leads as much as possible.

Case II. Sonar unit not receiving bottom reading.

(Be sure sonar unit is on current list of models compatible with Universal Sonar) see page 12-4

Step 1. Customer should first refer to the sonar unit's owner's manual for its specific trouble-shooting guide.

A. If customer still has the original transducer that came with the sonar unit; he can use this to determine if the sonar unit faulty or if the Universal transducer is at fault.

A-1. If sonar works properly with original transducer; proceed to **Step 2**.

A-2. If sonar still does not receive bottom reading, problem lies in sonar unit.

Step 2. Verify capacitance measures according to the following picture **(Figure 1**, **page 12-3)** and chart **(Chart A, page 12-3)**.

A. Measure the capacitance of the transducer at the extension cable plug end that exits the motor coil cord (PD/AP and Genesis models) or footpedal (Maxxum foot-control models) using your capacitance meter as per **Figure 1**. Touch the red and black probes from your capacitance meter to the correct pins on the plug (transducer + and -). For proper orientation, be sure the connector key (ridge) is at the top of the plug as in **Figure 1, page 12-3** (just above and between the red and black probes).

A-1. If the capacitance falls within the minimum and maximum allowable limits (per **Chart A**) for the specific Minn Kota Universal Sonar motor being tested, go to **Step 3**.

A-2. If the capacitance falls outside the minimum and maximum allowable limits, go to **Step 4**.

Step 3. Perform a continuity check on the adapter cable. (This is the short cable that goes from the sonar unit to the extension cable plug end.)

A. Identify Sonar make, then consult pin-out diagram for that adapter cable (starting on page 12-7). Check continuity from Minn Kota pins to Sonar adapter plug pins.

A-1. If the adapter has continuity through all three pins, the problem lies with the sonar unit (not the Minn Kota Universal Sonar motor). The customer should refer to his sonar unit owner's manual.

A-2. If the adapter does not have continuity, adapter is defective. Replace adapter. Procedure is complete.

Step 4. Measure the capacitance of the Universal transducer assembly.

A. Remove the control box cover.

B. Disconnect extension cable and the transducer plug assembly in the control box.

C. Take the same type of capacitance reading (as above) on the Universal transducer plug (exiting the shaft of the motor).

D. Refer to **Chart A** for the particular Universal Sonar model being tested to find the Minn Kota transducer part number (P/N). Cross-reference this part number with **Chart B** (page 12-3) to find the minimum and maximum specifications for the particular Universal transducer assembly tested. The capacitance for this reading should fall between the minimum and maximum allowable limits per **Chart B,** and *Capacitance Chart and Pin-Out Diagram* on page 12-5.

D-1. If the capacitance falls within the minimum and maximum allowable limits for the specific Minn Kota Universal Sonar motor being tested, go to **Step 5**.

D-2. If the capacitance falls outside the minimum and maximum allowable limits, go to **Step 6.**

Step 5. Using your VOM, perform a continuity test through the extension cable (see page 12-6 for *pin-out diagram*).

A. If there is not continuity through all the wires in the extension cable, the extension cable is defective. Replace extension cable and re-test capacity per **Step 2**.

B. If there is continuity through the extension cable, the problem is not with the transducer and plug assembly or with the extension and plug assembly. Re-check continuity of the adapter plug (**Step 3**) or suspect problem with sonar unit.

Step 6. Replace the front-end bell / transducer assembly on the motor and re-test capacitance per above procedures.

NOTE: on 4" diameter motors the transducer cable is held in place in the center section with a metal clip between the magnets. For ease of disassembly and reassembly, we recommend that the motor be removed from the shaft. On 3 5/8" diameter motors you will need to replace the shaft of the motor, also.

A. Retest per **Step 2**.

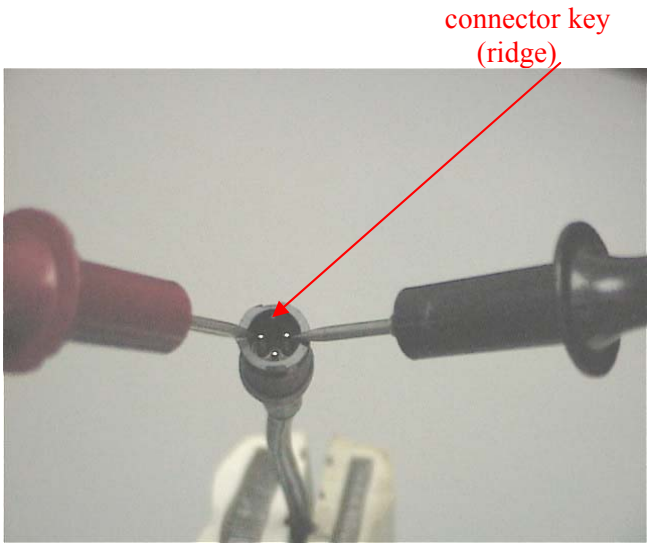


Figure 1

NOTE: you cannot order transducer replacements by the P/N listed below. Order end bell/transducer assembly per parts manual schematics.

Family	Model	Shaft Length	Product Code	Transducer P/N	Extension Cable P/N	Transducer Capacit. (pF) minimum	maximum
PD	55	48	1357397	987-003	221-1405 (9 ft)	798.34	1230.10
	55	54	1357398	987-004	221-1405	816.87	1252.74
	55	60	1357399	987-004	221-1405	816.87	1252.74
AutoPilot	55	48	1366019	987-003	221-1405	798.34	1230.10
	55	54	1366023	987-004	221-1405	816.87	1252.74
	65	54	1366039	987-004	221-1405	816.87	1252.74
	65	60	1366042	987-004	221-1405	816.87	1252.74
Genesis	55	45	1352711	987-003	221-1405	798.34	1230.10
	55	52	1352713	987-004	221-1405	816.87	1252.74
	74	45	1352721	987-004	221-1405	816.87	1252.74
	74	60	1352731	987-005	221-1405	847.74	1290.47
Maxxum	65	42	1368361	987-003	221-1400 (14.5 ft)	930.06	1396.11
	65	52	1368363	987-004	221-1400	945.58	1418.75
	74	42	1368371	987-004	221-1400	948.58	1418.75
	74	52	1368272	987-004	221-1400	948.58	1418.75
	74	62	1368374	987-005	221-1400	979.45	1456.48

Chart A

Description	P/N	Capacitance (pF) minimum	maximum
Transducer	987-003	578.14	945.87
	987-004	596.66	968.50
	987-005	623.53	1006.23

Chart B

With the proper Minn Kota adapter cable the Universal Sonar transducer will be compatible with the following sonar units:

Bottom Line:

Tournament NCC 5300, Tournament NCC6500 **Minn Kota Adapter: MKR-US-2**

Tournament 1250, Tournament 3310, Tournament 4300, Tournament 3100, Tournament 4100, Tournament 5100, Tournament NCC6300, Tournament 320MAX, Tournament 480MAX
Minn Kota Adapter: MKR-US-3

Eagle:

FishEasy 2, FishEasy 2P (manufactured prior to 2003), FishEasy 2T (manufactured prior to 2003), FishMark 160, FishMark 240, TriFinder 2 **Minn Kota Adapter: MKR-US-5**

Accura 240, Accura 240FLW, Fish Easy, Fish Easy ST, Fish ID 128, Optima, Strata 128, Strata 128 Plus, Strataview 128, Trifinder, Trifinder FLW, Ultra Classic, Ultra Classic Plus
Minn Kota Adapter: MKR-US-6

Cuda 128, Cuda 168, Cuda 168EX, Cuda 240GPS, FishEasy 2 (manufactured after 2002), FishEasy 2T (manufactured after 2002), FishElite 320, FishElite 480DF, FishMark 320, FishMark 480, SeaFinder 240DF, SeaFinder 320DF, SeaCharter 480DF
Minn Kota Adapter: MKR-US-9

Garmin:

Fishfinder 100, Fishfinder 160, Fishfinder 240, Fishfinder 250, Fishfinder 250C, Fishfinder 320C, GPSMAP 168, GPSMAP 178C, * Fishfinder 80, *Fishfinder 120 (* with optional Garmin part number 010-10145-00, sold separately) **Minn Kota Adapter: MKR-US-1**

Humminbird:

100SX, 405SX, LCRW, N525, Tracker Pro 160, Boater's World Pro Angler 400+, Legend 1000, Legend 2000
Minn Kota Adapter: MKR-US-4

Legend 3000, 400TX, 300TX, Piranha 1, Piranha 2, Piranha 3, Piranha 4, Piranha 5, PiranhaMAX 10, PiranhaMAX 15, PiranhaMAX 20, Matrix 10, Matrix 15, Matrix 17, Matrix 20, Matrix 25, Matrix 27, Matrix 35, Matrix 37, Matrix 55, Matrix 65, Matrix, 67, Matrix 97
Minn Kota Adapter: MKR-US-8

Lowrance:

LCX-15C, LCX-15CI, LCX-15CT, LCX-15MT, LCX-16CI, LCX-16CT, LCX-18C, LCX-19C, LCX-104C, LMS-240, LMS-320, LMS-320DF, X51, X-58DF, X71, X-87, X-88DF, X91, X-97, X-98DF, 100C, X-105C DF, X125, X-126 DF, X-135, X-136 DF, LMS-480, LMS-480 DF, LMS-330C, LMS-335C DF
Minn Kota Adapter: MKR-US-5

X24, X28, X29, X38, X48, X49, X58, X65, X75, X85
Minn Kota Adapter: MKR-US-6

X-47, X-47EX, X-67C, M-56, M-68C **Minn Kota Adapter: MKR-US-9**

Vexilar:

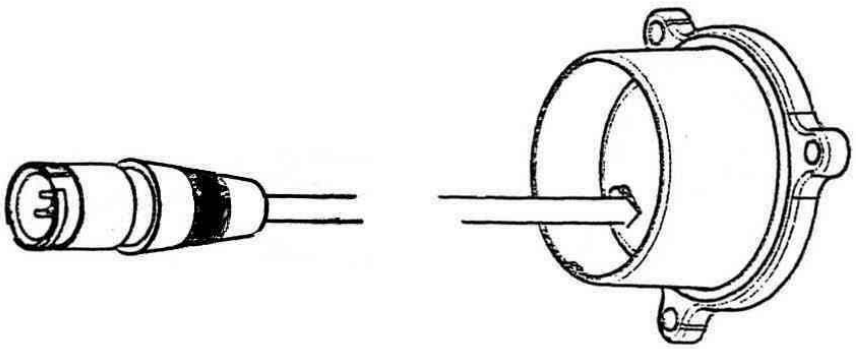
FL-8, FL-8 SE, FL-8 SLT, FL-10, FL-18CLC-200 **Minn Kota Adapter: MKR-US-7**

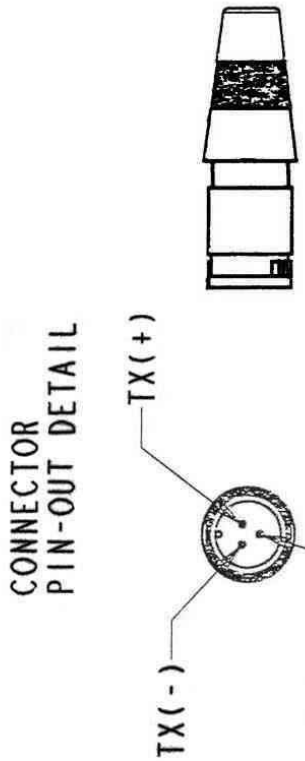
Zercom:

Z160 **Minn Kota Adapter: MKR-US-4**

For the most current list of sonar units, please visit our web site at www.minnkotamotors.com or call Minn Kota Technical Services at (800) 227-6433.

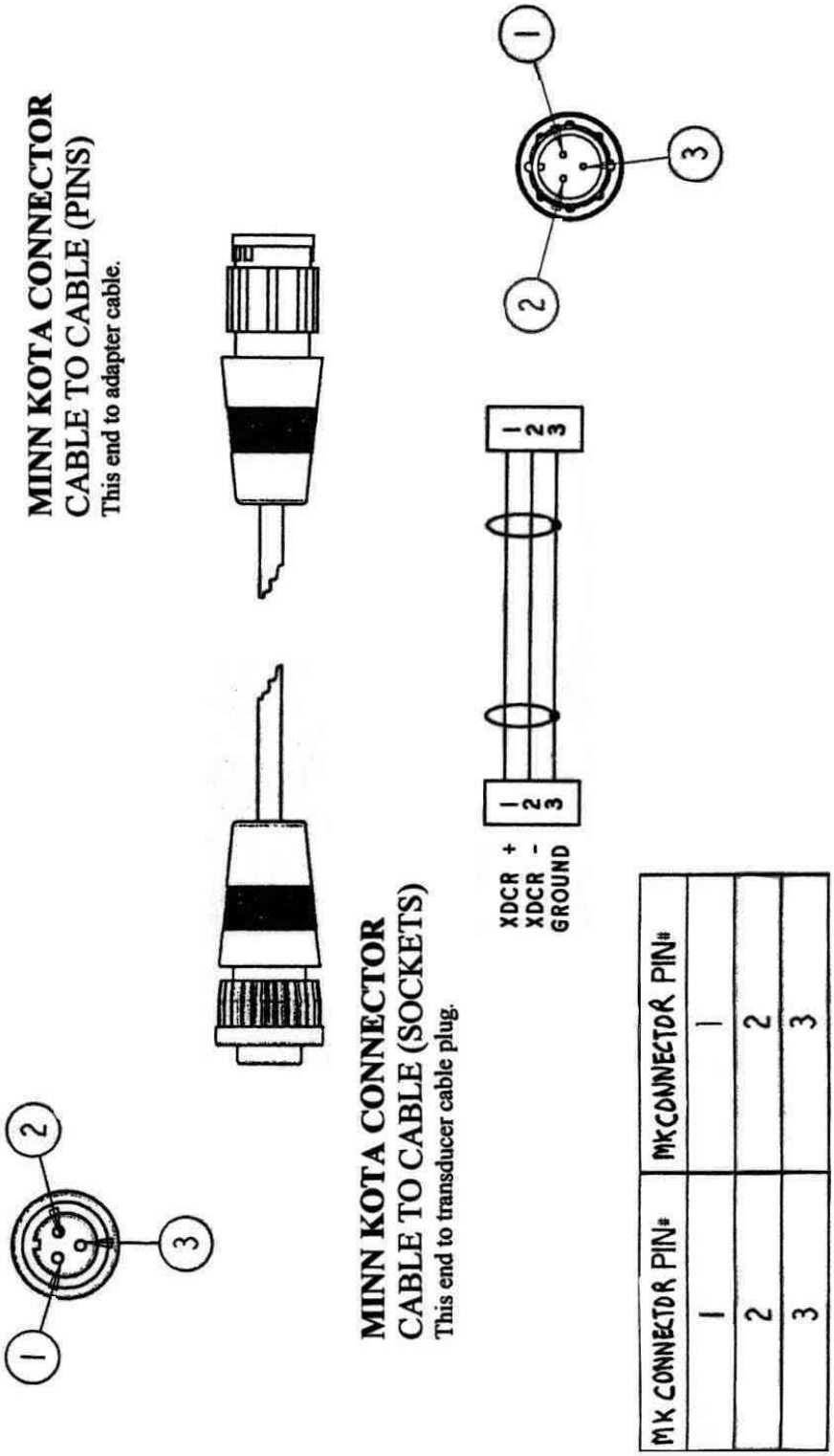
Minn Kota Universal Sonar Transducer & Cable Assembly
Note: Take transducer capacitance readings across the TX(-) and TX(+) pins.



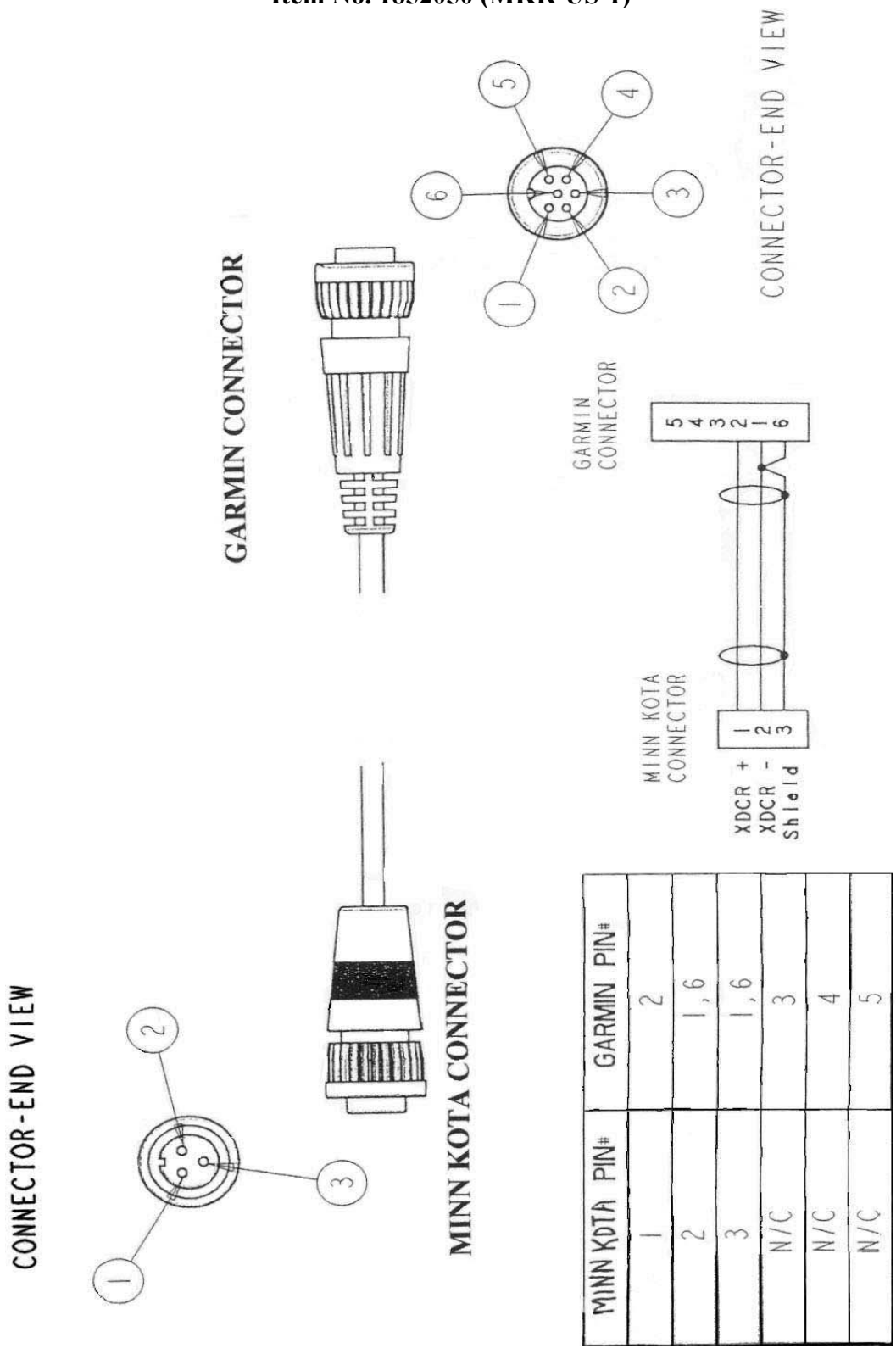


MINN KOTA Part #	Capacitance Maximum	Capacitance Minimum
987-005	1006.23 pF	623.53 pF
987-004	968.50 pF	596.66 pF
987-003	945.87 pF	578.14 pF

Minn Kota Cable Extension
Part No. 2211400 and 2211405

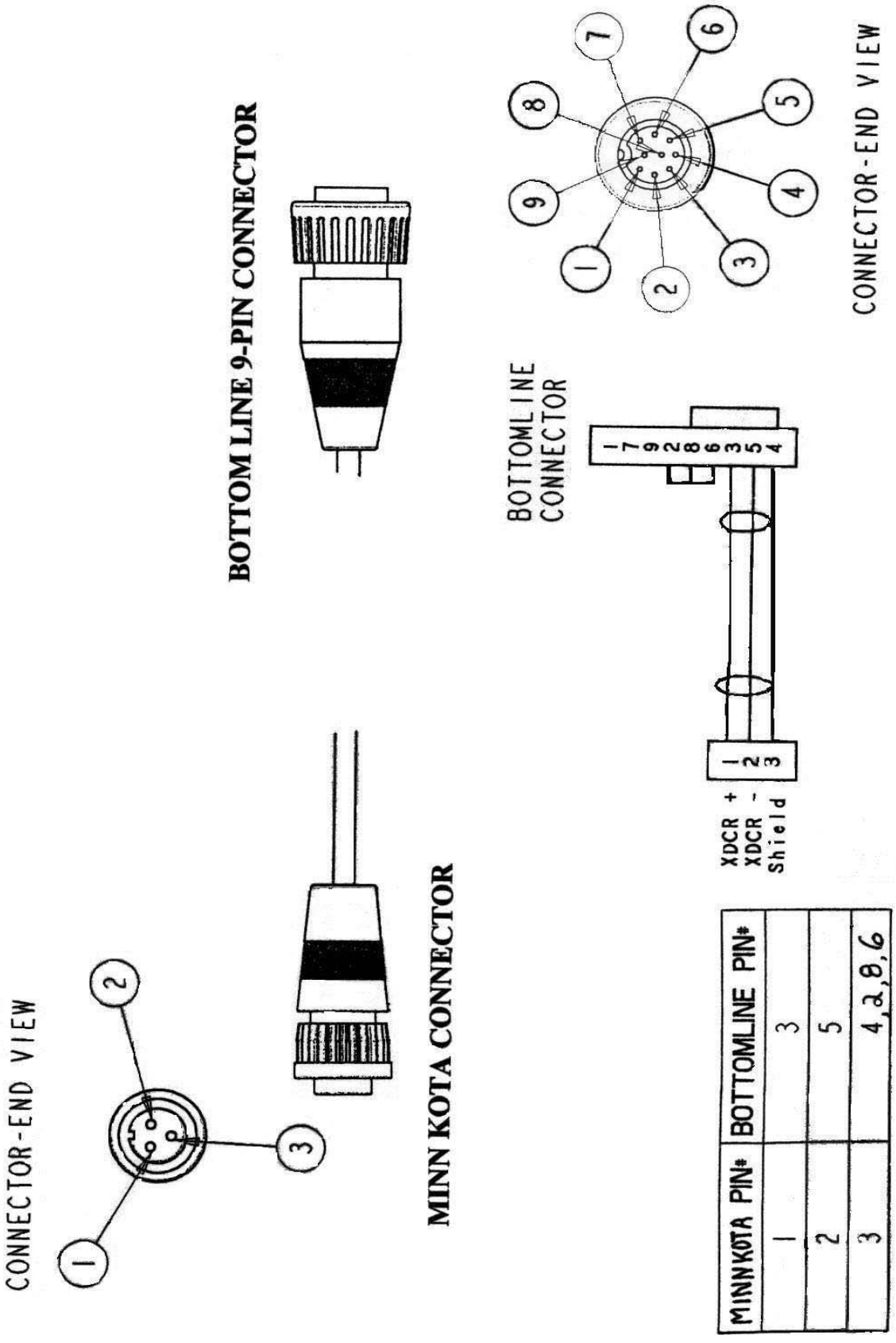


Garmin Adapter Cable
Item No. 1852050 (MKR-US-1)

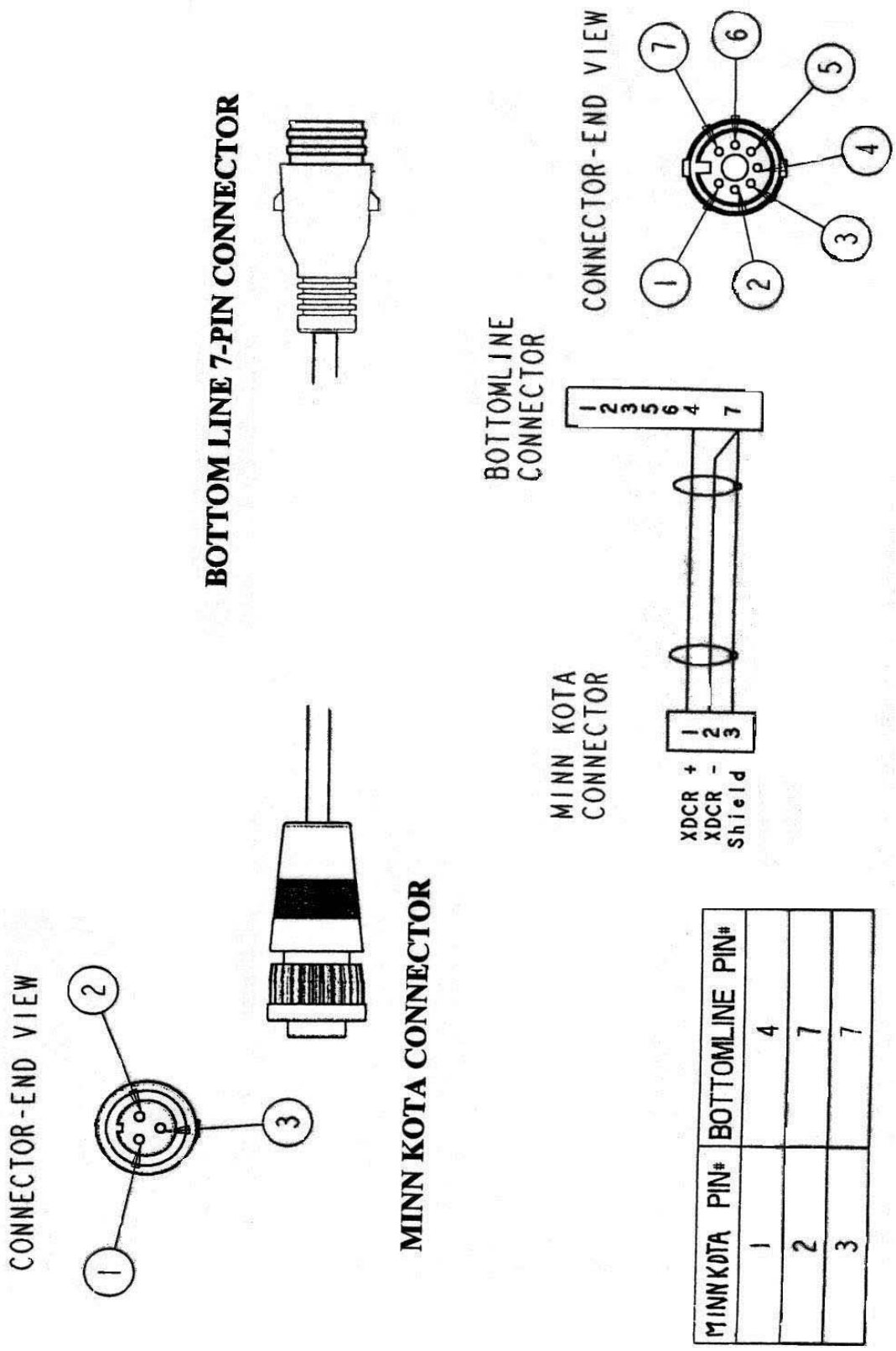


MINN KOTA PIN#	GARMIN PIN#
1	2
2	1, 6
3	1, 6
N/C	3
N/C	4
N/C	5

Bottom Line 9-Pin Adapter Cable
Item No. 1852051 (MKR-US-2)

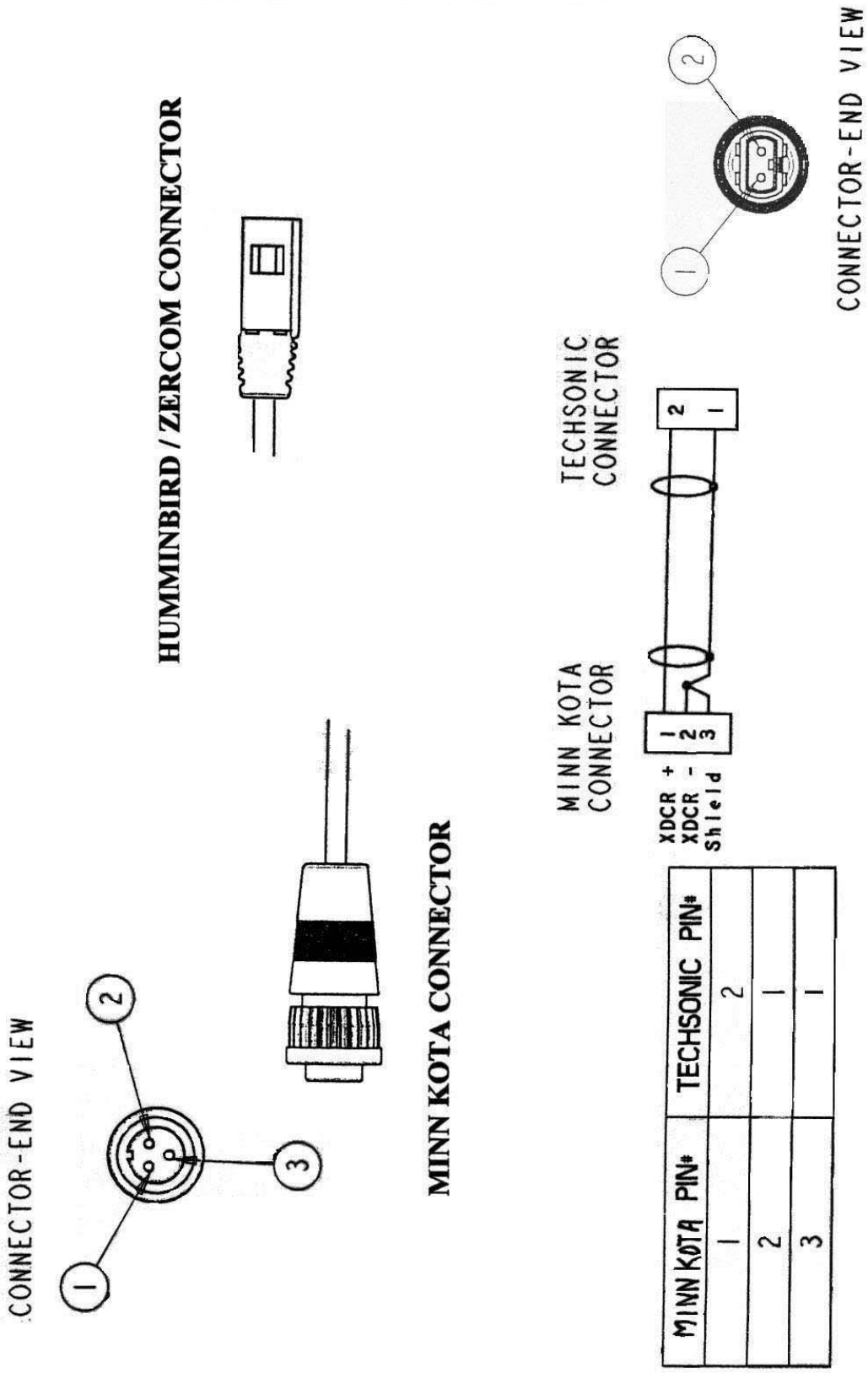


Bottom Line 7-Pin Adapter Cable
Item No. 1852052 (MKR-US-3)

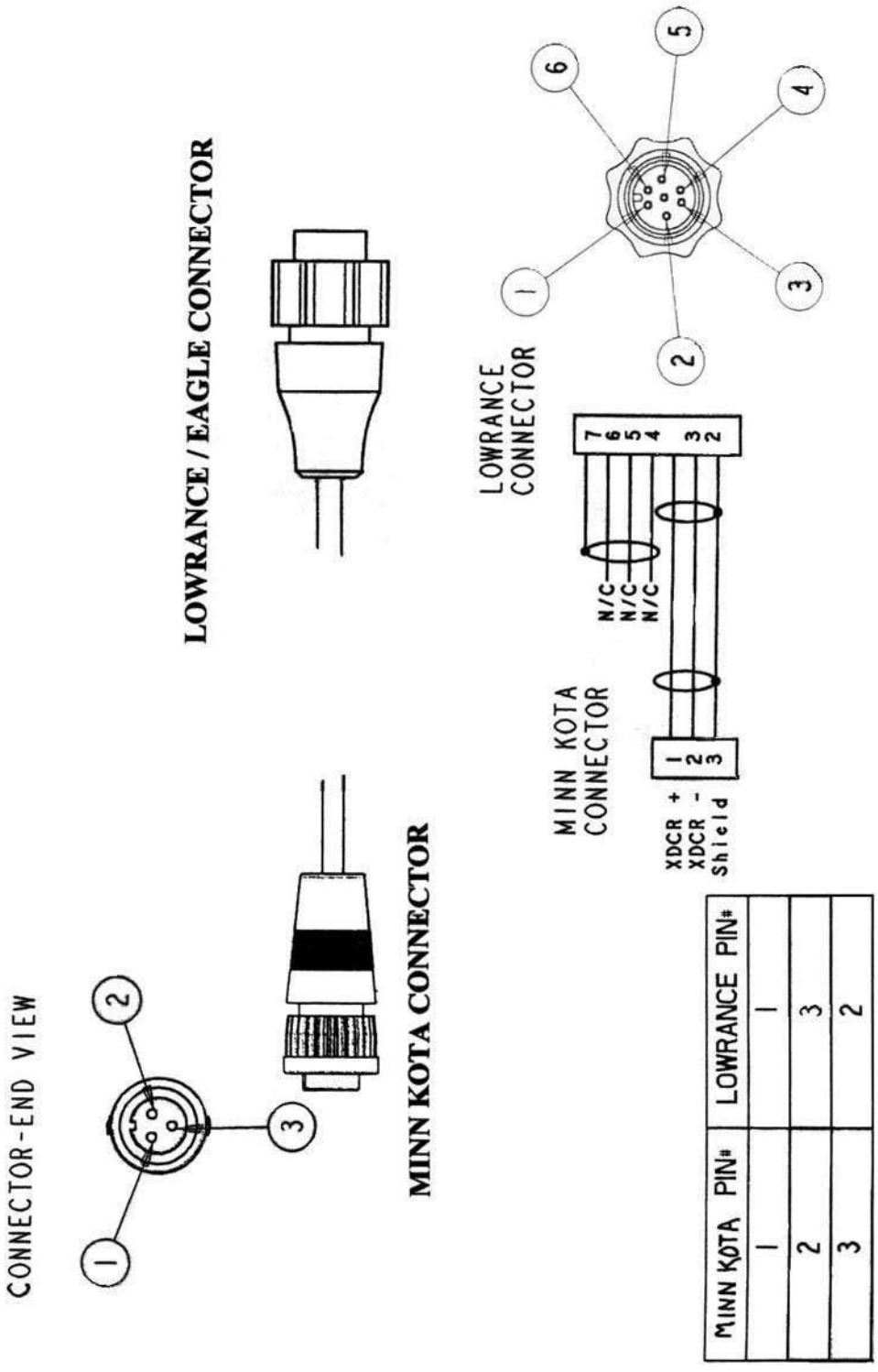


MINN KOTA PIN#	BOTTOMLINE PIN#
1	4
2	7
3	7

Humminbird / Zercom (Techsonic) Adapter Cable
Item No. 1852053 (MKR-US-4)

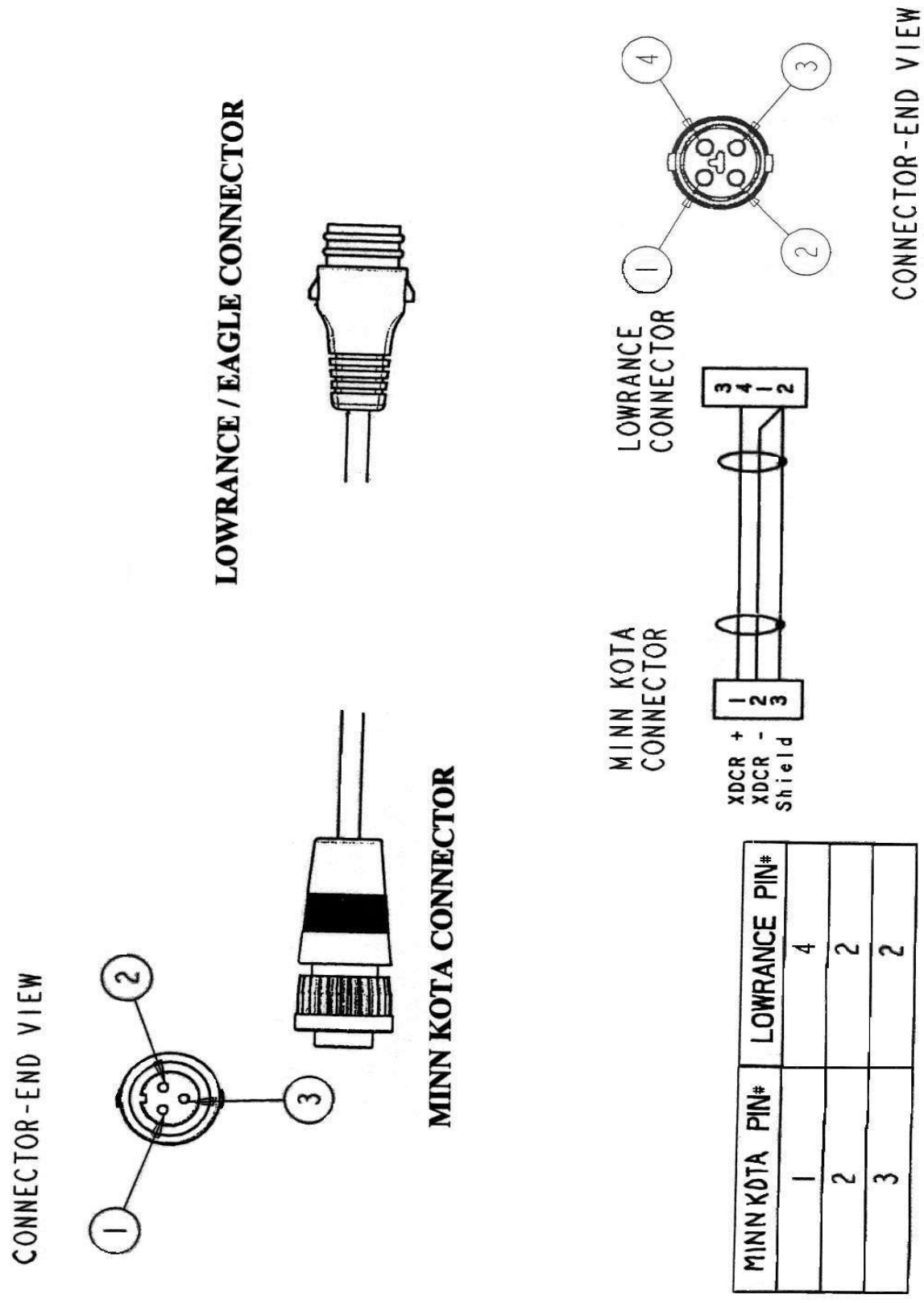


Lowrance / Eagle Adapter Cable (gray)
Item No. 1852054 (MKR-US-5)

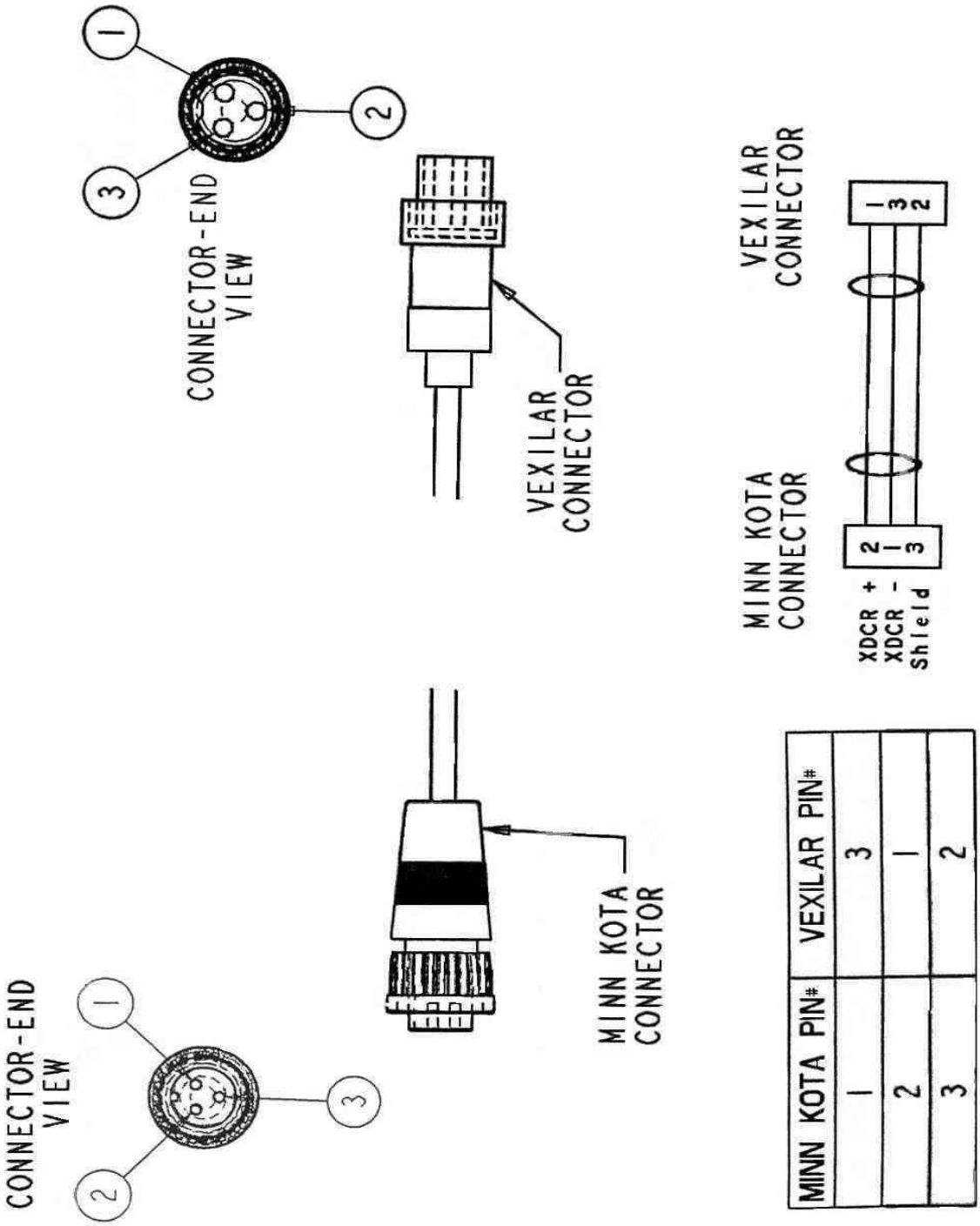


MINN KOTA PIN#	LOWRANCE PIN#
1	1
2	3
3	2

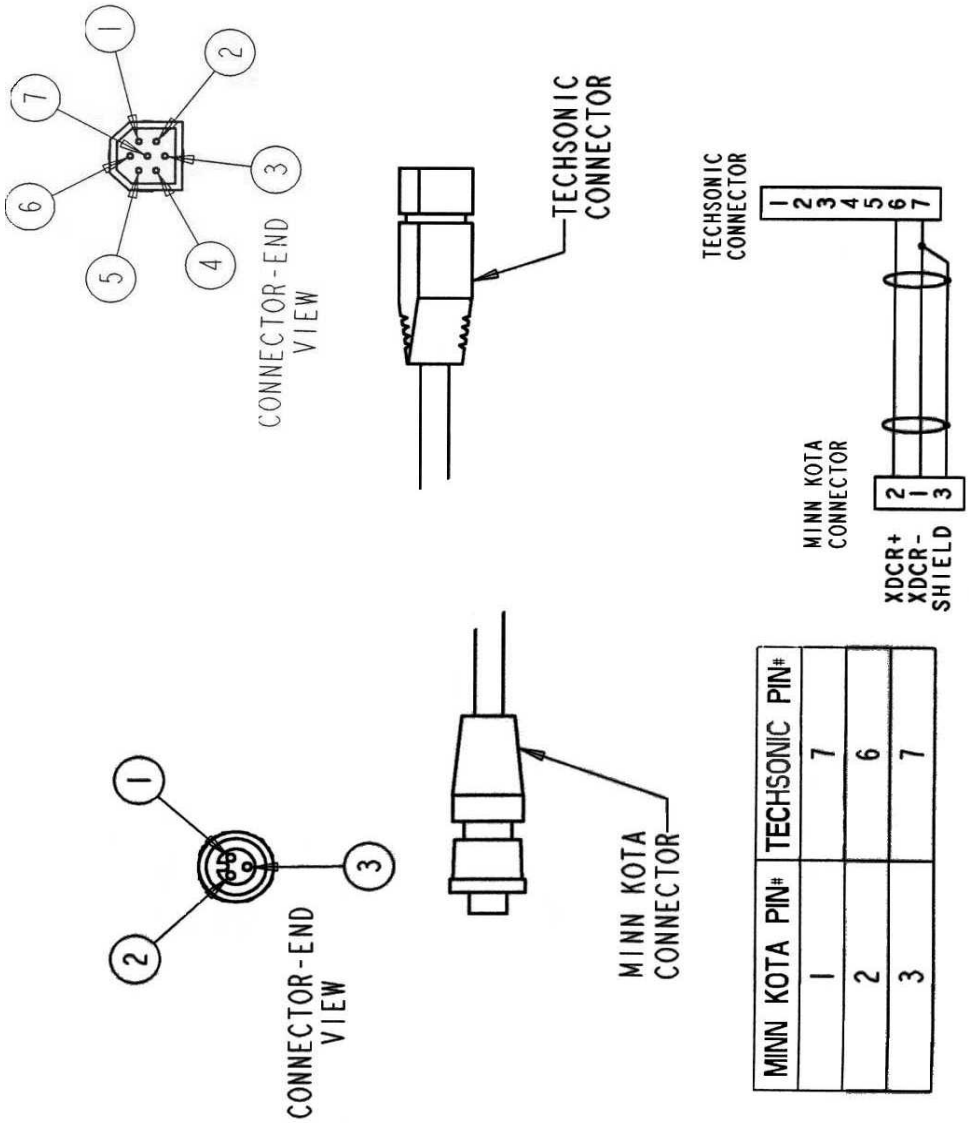
Lowrance / Eagle Adapter Cable (black)
Item No. 1852055 (MKR-US-6)



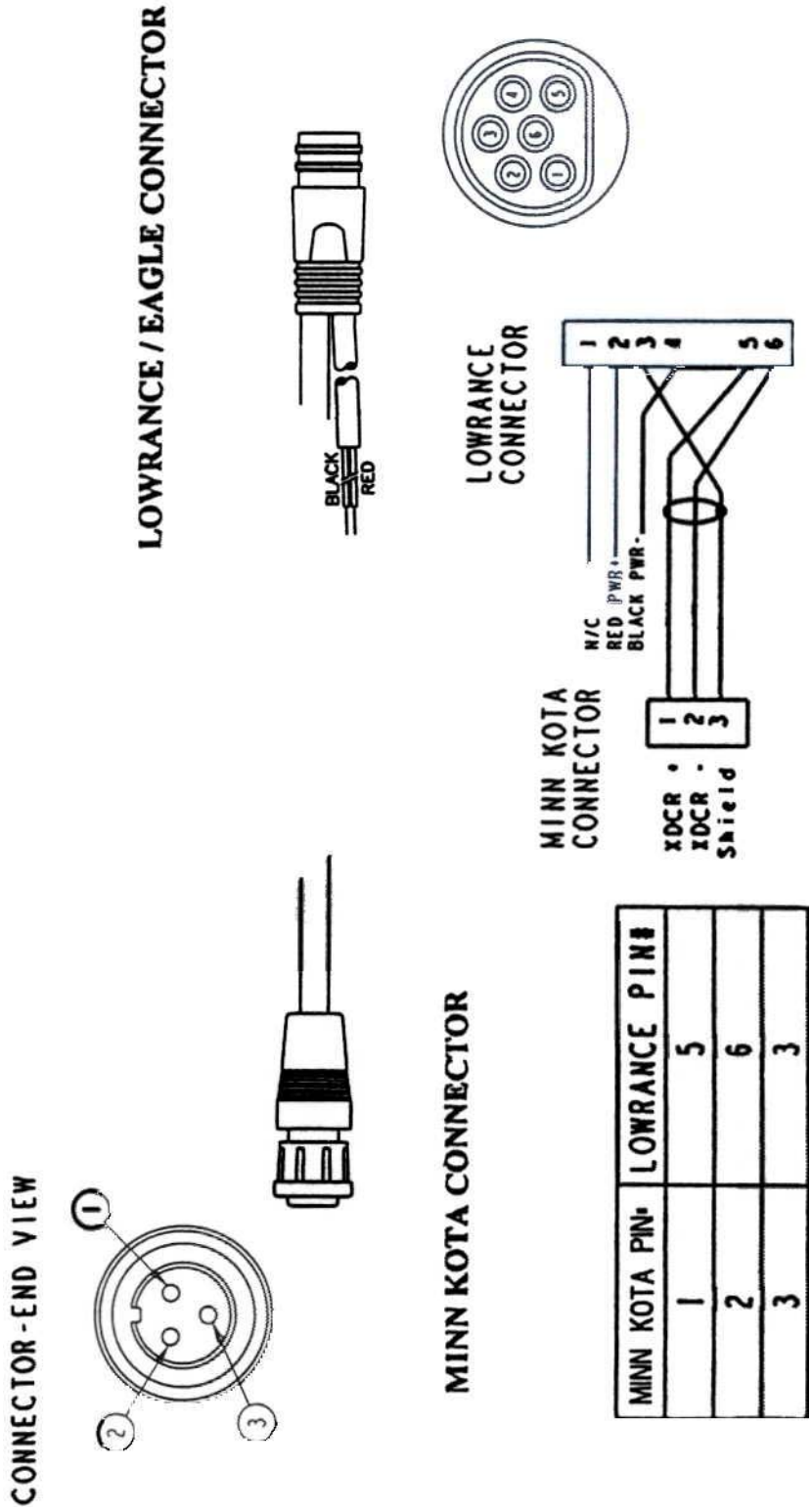
Vexilar Adapter Cable
Item No. 1852056 (MKR-US-7)



Humminbird (Techsonic) Adapter Cable
Item No. 1852057 (MKR-US-8)



Lowrance / Eagle Adapter Cable
Part No. 1852058 (MKR-US-9)



MINN KOTA PIN#	LOWRANCE PIN#
1	5
2	6
3	3